

REMARKS

Reconsideration and reversal of the rejections set forth in the final rejection of May 23, 2006 are requested in light of the following.

Independent claim 14, the only independent claim at bar, is directed to a method of using a member or members of a Markush grouping consisting of AA/APES, AA/PEGAE and AA/1-allyloxy-2,3-propanediol to treat a semi-permeable membrane wherein the water system in contact with the membrane is prone to calcium phosphate deposition. Surprisingly, these polymers inhibit calcium phosphate while not adversely affecting salt rejection of the membrane and throughput of the water through the filter membrane.

To be sure, these same polymers, and many others, are disclosed in U.S. Patent 6,444,747 (Chen et al.). Chen et al. '747 does not teach or suggest that the disclosed polymers could effectively inhibit calcium phosphate deposition while not adversely affect salt rejection and throughput of the membrane.

The Examiner cites to McNeel et al. as allegedly teaching that calcium phosphate inhibition and concurrent lack of adverse effects on salt rejection and system throughput are inherent properties of "cleaning or treatment of membranes using acrylic acid-containing formulations". McNeel indicates generally that the compositions therein disclosed control fouling "without substantially hindering and/or having detrimental effects on the separation membrane which include membrane fouling". Note, however, that calcium phosphate inhibition is not specifically identified as a problematic fouling species in McNeel et al., and the general reference to polyacrylic acid antiscalants at column 4, line 5 does not reasonably suggest to anyone the specific allyl ether functionality required by the copolymers set forth in independent claim 14. Stated simply, no one, after a reading of Chen et al. and McNeel et al., would find any teaching in these references that the specific copolymers set forth in that claim would fulfill the functional limitations of the claim. If the Examiner persists in his rejection, he is respectfully requested to point out specifically where McNeel et al. refers to any allyloxy functional copolymer and where

this reference indicates that these copolymers can function to inhibit calcium phosphate inhibition without adversely affecting salt retention and system throughput.

When a combination of references is alleged to render an invention “obvious”, the prior art must be found (1) to have suggested the claimed invention to one of ordinary skill in the art, and the prior art must (2) reveal that those of ordinary skill in the art would have a reasonable expectation of success. Medichem, S.A. v. Rolabo, S.L., 437 F.3d 1157, 1164 (Fed. Cir. 2006).

In the case at bar, a skilled artisan would not, after reading Chen et al. and McNeel et al., have derived any suggestion that the specific allyloxy copolymers set forth in claim 14 could be used to inhibit calcium phosphate in filter membrane systems without adversely affecting salt rejection and system throughput. These references are also devoid of any suggestion that the specific allyloxy copolymers set forth in the claim would be reasonably expected to perform as claimed. As the Federal Circuit has indicated, a reasonable expectation of success means that one must be motivated to do more than merely “vary all parameters or try each of numerous possible choices until one possibly arrived at a successful result, where the prior art gave either no indication of which parameters were critical or no direction as to which of many possible choices is likely to be successful”. Id. (citing In re O’Farrell, 853 F.2d 894, 903 (Fed. Cir. 1988)).

The patent to Amjad does nothing to remedy the deficient teaching of the above references. Amjad is not at all suggestive of the allyloxy functional copolymers as set forth in instant claim 14. Also, this patent does not teach calcium phosphate scale inhibition.

The Kessler et al. ‘755 reference is directed toward the inhibition of scale and corrosion in cooling water systems. There is no hint or suggestion in this reference directed toward utilization of the specific polymers now set forth in claim 14 in an RO membrane containing system wherein the treatment agent is effective in inhibiting calcium phosphate precipitation while not adversely affecting salt rejection. As the Examiner notes, an AA/AHPSE/PEGAE terpolymer is disclosed at column 6, line 49. This reference highlights the surprising nature of the invention in that the AA/AHPSE polymer preferred for use in conjunction with the ‘755 reference (see column 4, lines 32-33) performs quite poorly in the calcium phosphate inhibition tests reported graphically in Fig.

5 of the specification and discussed in paragraphs [0038] and [0045] of the specification. The AA/AHPSE copolymer includes allyloxy functionality similar to the specific copolymers set forth in independent claim 14 and dependent claims 12, 13, and 15. Accordingly, the failure of AA/AHPSE to perform well in the claimed environment to provide the claimed functional results convincingly demonstrates the unexpected, surprising results of the claimed invention.

Synthesis Example 11 of cited Publication 2003/0008793 A1 uses 3-allyoxy-1,2-propanediol as a precursor monomer in the preparation of acrylic acid/poly(ethylene glycol /propylene glycol) allyl ether. The polymers are used as liquid detergents of the type used to launder fabrics and the like. No suggestion is found that these polymers can be used as calcium phosphate scale inhibitors in the claimed environment to provide the claimed functional limitations.

For all of the above reasons, it is respectfully submitted that the claims define patentable subject matter. The prompt issuance of a Notice of Allowance is accordingly solicited.

The Examiner is invited to call the undersigned if, during the course of reconsideration of this application, any question or comment should arise.

Respectfully submitted,

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